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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/627,525

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Richard C.H. Lee

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06/14/2005

BLAKELY SOKOLOFF TAYLOR & ZAFMAN
12400 WILSHIRE BOULEVARD
SEVENTH FLOOR
LOS ANGELES, CA 90025-1030

EXAMINER

QI, ZHI QIANG

ART UNIT

PAPER NUMBER

2871

DATE MAILED: 06/14/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/627,525	Applicant(s) LEE ET AL.	
	Examiner Mike Qi	Art Unit 2871	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 April 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-17 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>9/12/03; 1/20/04</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

1. Applicant's election without traverse in the reply filed on Apr. 11, 2005 is acknowledged, and the claims 18-43 have been cancelled.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claim 8 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 8, recitation "... the two elliptical polarizers are selected from the group comprising wideband and otherwise than wideband." In which the wideband means a wide wavelength band, and otherwise than wide bane means otherwise than wide wavelength band and could be narrow wavelength band. Such that, how a wide wavelength band and a narrow wavelength band can be a polarizer. The specification described (paragraph 0017) that a simple way of making a circular polarizer is to laminate a linear polarizer with a quarter wave retardation film, and the quarter wave retardation film is preferably of wideband, and the elliptical polarizers is circular polarization. Such that, the polarizers are a linear polarizers laminated with quarter wave retardation film to form circular polarizers. For examination purpose, it is interpreted that the two elliptical polarizers are two circular polarizers.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over US 5,796,454 (Ma) in view of US 5,748,277 (Hung et al) and US 6,388,883 B1 (Iwamatsu et al)

Claim 1, Ma discloses (col.5, line 26 – col.6, line 68; Fig.2) that a reflective liquid crystal display comprising:

- a liquid crystal display of controllable planar structure and focal conic structure;
- two transparent substrates (220, 230) having conductive electrode (241, 242);
- two elliptical (circular) polarizers (250,260);
- liquid crystal material (210) being between the two transparent substrates(220, 230);
- the liquid crystal material (210) and the transparent substrates (220, 230) being between the polarizers (250, 260);
- an optical reflector (270).

Ma does not explicitly disclose that the liquid crystal material is chiral nematic liquid crystal material.

However, Ma discloses (col.5, line 26 – col.6, line 68; Fig.2) that the liquid crystal material is cholesteric liquid crystal material. Further, Hung discloses (col.1, lines 6-10) that a chiral nematic, also called cholesteric reflective bistable liquid crystal material. Therefore, cholesteric reflective bistable liquid crystal material also called chiral nematic reflective bistable liquid crystal material. Furthermore, Iwamatsu also indicates (col.1, line 19 – col.2, line 16) that using chiral nematic liquid crystal which is produced by adding a chiral agent to nematic liquid crystal to cause the liquid crystal to exhibit a cholesteric phase in a room temperature so as to provide a liquid crystal composition and a liquid crystal light modulating device which are good in properties, such as improved reflectance and high contrast.

Therefore, it would have been obvious to those skilled in the art at the time the invention was made to use chiral nematic liquid crystal material as claimed in claim 1 for achieving good properties such as improved reflectance and high contrast.

6. Claims 2-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ma, Hung and Iwamatsu as applied to claim 1 above, and further in view of US 6,757,039 B2 (Ma' 039).

Claims 2-7, lacking limitations are such that one elliptical polarizer is of opposite polarity of the liquid crystal material; optical "ON" bright state when the liquid crystal material is in the focal conic state of full spectrum white; optical "OFF" dark state when the liquid crystal material is in the planar state; and the liquid crystal has the reflection spectrum of a particular peak wavelength and elliptical polarization; and the two elliptical polarizers are of opposite polarities.

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However, Ma' 390 discloses (col.6, line 28 – col.9, line 23; Figs.1-3) that the front polarizer (150) has either the same handedness or opposite handedness of liquid crystal material (110), and due to the opposite handedness with the LC material, the light will pass through the liquid crystal cell structure without attenuation, so as to obtain bright white. Ma'390 also indicates (col. 8, lines 17-25) that the display mode can be a reverse version that provides a pure white optical "ON" state in the focal conic area (optical "ON" bright state when the liquid crystal material is in the focal conic state), and a black optical "OFF" state in the planar texture area (optical "OFF" dark state when the liquid crystal material is in the planar state), and due to the opposite polarity of the front and back elliptical polarizers, the liquid crystal material would have the reflection spectrum of a particular peak wavelength and elliptical polarization, so that the brightness of the optical "ON" state is extraordinary high as the light recycling effect of the elliptical polarizers so as to improve the contrast ratio.

Therefore, it would have been obvious to those skilled in the art at the time the invention was made to arrange the elliptical polarizers as claimed in claims 5-7 for achieving the high brightness display in the optical "ON" state so as to improve the contrast ratio.

Claim 8, Ma discloses (col.5, line 26 – col.6, line 68; Fig.2) that a reflective liquid crystal display comprising two circular polarizers (250,260) (elliptical polarizers).

Claim 9, Ma discloses (col.5, line 26 – col.6, line 68; Fig.2) that a reflective liquid crystal display comprising a reflector (270) that is laminated on the rear polarizer (260).

Claim 10, Ma discloses (col.5, line 26 – col.6, line 68; Fig.2) that the light entering into the liquid crystal material (210) from above or below is circular polarized (elliptical polarized).

Claim 11, lacking limitation is such that the arrangement of the rear elliptical polarizer is such that the light incident on the reflector is linearly polarized.

However, Ma'309 discloses (col. 4, lines 49-65) that the prior art of record (such as US 6,344,887) shows that the two circular polarizers are arranged in such a way that one linear polarizer with a retardation film to generate the circular polarization, so that for the rear polarization, the light incident on the reflector is linear polarized. Therefore, in order to generate a circular polarization, the light incident on the reflector should be linearly polarized and then through retardation film to generate the circular polarization, and that is known in the art and obvious.

Therefore, it would have been obvious to those skilled in the art at the time the invention was made to arrange the rear elliptical polarizer in which the light incident on the reflector is linearly polarized in order to obtain the circular polarization.

Claims 12-13, lacking limitation is such that the front elliptical polarizer being of opposite polarity to the chiral nematic material (liquid crystal material), and the rear elliptical polarizer is of the same polarity as the chiral nematic material (liquid crystal material).

However, Ma'309 discloses (col.6, line 28 – col.9, line 23; Figs.1-3) that the front polarizer (150) has either the same handedness or opposite handedness of liquid crystal material (110), and due to the opposite handedness with the LC material (front

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polarizer being of opposite polarity to the liquid crystal material), the light will pass through the liquid crystal cell structure without attenuation, so as to obtain bright white. Ma'390 also indicates (col. 8, lines 17-25) that the display mode can be a reverse version that due to the opposite polarity of the front and back elliptical polarizers (the front polarizer with opposite polarity to the liquid crystal, the back polarizer would be the same polarity to the liquid crystal material), the brightness of the optical "ON" state is extraordinary high as the light recycling effect of the elliptical polarizers so as to improve the contrast ratio.

Therefore, it would have been obvious to those skilled in the art at the time the invention was made to arrange the front and rear elliptical polarizers as claimed in claims 12-13 for achieving the high brightness display.

Claim 14, lacking limitation is such that the reflector is diffusive.

However, Ma'309 discloses (col.5, lines 34-35) that a diffusing layer is necessary to enlarge the viewing angle.

Therefore, it would have been obvious to those skilled in the art at the time the invention was made to use diffusive reflector in order to enlarge the viewing angle for the display.

Claims 15-17, lacking limitation is such that the "ON" state is caused by depolarization of light passing through the focal conic state chiral nematic material (liquid crystal in focal conic state); and the depolarization is independent of wavelength; and in the "OFF" state, the opposite polarity of elliptically polarized light enters into the

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planar state chiral nematic material and passes through without any polarization change.

However, Ma'309 discloses (col.10, lines 3 – 26) that the light passing through the display (the liquid crystal material) in focal conic texture area (focal conic state) will become depolarized light because of a strong scattering, and then the display will be on an optical "ON" state in the focal conic area. Such that the "ON" state is caused by depolarization of light passing through the focal conic state liquid crystal, and the depolarization would be independent of wavelength as the strong scattering. Ma'309 also discloses (col.10, lines 3 – 26) that the front elliptical polarizer has the exactly opposite polarity, so that the display would be on an optical dark ("OFF") state (without any polarization change) in the planar state. Such that in the "OFF" state, the opposite polarity of the elliptical polarized light enters into the planar state liquid crystal material and passes through without any polarization change and become optical dark. Ma'309 indicates (col.8, lines 18-25) that such pure white optical "ON" state in the focal conic area and black optical "OFF" state in the planar texture area would obtain high brightness of the optical "ON" state, so that would improve the contrast ratio.

Therefore, it would have been obvious to those skilled in the art at the time the invention was made to arrange such optical "ON" state and optical "OFF" state as claimed in claims 15-17 for achieving the high brightness and improving the contrast ratio.

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Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mike Qi whose telephone number is (571) 272-2299.

The examiner can normally be reached on M-T 8:00 am-5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Kim can be reached on (571) 272-2293. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


**ROBERT H. KIM
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800**

Mike Qi
June 6, 2005